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10/656,280	09/08/2003	Tatsuya Niimi	242548US2	7137
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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
DOTE, JANIS L				
ART UNIT		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com

oblonpat@oblon.com

jgardner@oblon.com

Office Action Summary

Application No.

10/656,280

Applicant(s)

NIIMI ET AL.

Examiner

Janis L. Dote

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/5508)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicants' submission filed on Oct. 7, 2008, has been entered.

2. The examiner acknowledges the amendments to claim 1 and the addition of claim 21 filed on Oct. 7, 2008. Claims 1-15 and 21 are pending.

3. Applicants' election without traverse of the invention of Group I, claims 1-15 and added claim 21, in the reply filed on Nov. 14, 2005, is acknowledged.

4. The rejection of claims 1, 2, 5, 7, 8, 10, 11, 13, and 15 under 35 U.S.C. 102(e)/103(a) over US 6,853,823 (Sugino), set forth in the office action mailed on Jul. 7, 2008, paragraph 7, has been withdrawn in response to the amendment to claim 1 filed on Oct. 7, 2008. That amendment to claim 1 adds the limitation that a filtered dispersion for forming the charge generation

layer comprises the titanyl phthalocyanine crystals having an average particle diameter of 0.3 μm or less. Sugino does not teach or suggest a charge generation layer comprising titanyl phthalocyanine crystals having an average particle diameter of 0.3 μm or less as recited in instant claim 1.

The terminal disclaimer filed on Oct. 7, 2008, disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Patent Nos. 7,029,810, 7,371,491, and 7,419,751 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Accordingly, the rejections on the ground of nonstatutory obviousness-type double patenting of claims 1-15 over the claims in US Patent No. 7,029,810 B2 (Toda) in view of the cited prior art, of claims 1-3, 5, 6 and 9-15 over the claims in US Patent No. 7,419,751 (Application 10/454,556) in view of the cited prior art, and of claims 1-3, 5, 6, and 10-15 over claims in US Patent No. 7,371,491 B2 (Niimi'491) in view of the cited prior art, set forth in the office action mailed on Jul. 7, 2008, paragraphs 17, 18, and 20, respectively, have been withdrawn.

5. The examiner notes that the instant specification at page 20, lines 13-18, defines the term "proximal charging system

charging member" recited in instant claim 12 as "a charging member which is not brought into contact with but proximal to the surface of the photoconductor so as to have a gap of 200 μm or less between the surface of a photoconductor and the surface of the charging member."

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-15 and 21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Instant claims 1 and 21 are indefinite in the phrase "titanyl phthalocyanine crystals having, as a diffraction peak ($\pm 0.2^\circ$) of Bragg angle 2θ . . . main peaks at . . . and not having a peak within a range of from 7.3° to 9.4° " (emphasis added) because claims 1 and 21 previously recite that the titanyl phthalocyanine crystals have main peaks at " 9.4° . . . and a peak at 7.3° as a diffraction peak on the lowest angle side." It is not clear how the titanyl phthalocyanine crystals can have

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diffraction peaks at 9.4° and 7.3° and still have no peaks within the range of 7.3 to 9.4° .

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 1-15 and 21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant arts that the inventor(s), at the time the application was filed, had possession of the claimed invention.

(1) Instant claims 1 and 21 and claims 2-15, which depend on claim 1, recite that the "titanyl phthalocyanine crystals having, as a diffraction peak ($\pm 0.2^{\circ}$) of Bragg angle 2θ . . . main peaks at 9.4° . . . and a peak at 7.3° as a diffraction peak on the lowest angle side, and not having a peak within a range of from 7.3° to 9.4° " (emphasis added).

The originally filed specification does not provide an adequate written description of the titanyl phthalocyanine crystals diffraction peaks. The originally filed specification describes "titanyl phthalocyanine crystals having, as a diffraction peak ($\pm 0.2^\circ$) of Bragg angle 2θ . . . main peaks at 9.4° . . . and a peak at 7.3° as a diffraction peak on the lowest angle side, and not having a peak within a range of from 7.4° to 9.3° ", not from 7.3° to 9.4° as recited in instant claims 1 and 21. See the originally filed specification at page 12, line 16, page 19, line 15, page 40, lines 12-13, and page 44, line 25, to page 45, line 1. The limitation "not having a peak within a range of from 7.3° to 9.4° " is broader than the originally described limitation of "not having a peak within a range of from 7.4° to 9.3° " because it further excludes peaks between 7.3 to 7.4° and between 9.3 and 9.4° . Applicants have not indicated where in the originally filed specification there is an adequate written description of the limitation "not having a peak within a range of from 7.3° to 9.4° " recited in the instant claims.

(2) Instant claims 1 and claims 2 and 4-15, which depend on claim 1, further recite forming a dispersion and filtering the dispersion with a filter having an effective pore size of $3\text{ }\mu\text{m}$, such that the titanyl phthalocyanine crystals contained in the

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filtered dispersion have an "average particle diameter of 0.3 μm or less."

The originally filed specification does not provide an adequate written description of the filtered dispersion comprising the titanyl phthalocyanine crystals. The originally filed specification at page 12, lines 19-20, describes titanyl phthalocyanine crystals preferably having an average primary particle diameter less than 0.3 μm . The originally filed specification at page 51, lines 12-17, further describes filtering a dispersion through a "filter having an effective pore size of 3 μm or less . . . By this method, a dispersion containing only titanyl phthalocyanine crystals having a small particle diameter (less than 0.3 μm . . .) can be prepared (emphasis added). The filtered dispersion titanyl phthalocyanine crystals average particle diameter of 0.3 μm or less is broader than the originally described filtered dispersion titanyl phthalocyanine crystals average particle diameter. The average particle diameter of 0.3 μm or less includes an average particle diameter of 0.3 μm .

(3) Instant claim 21 further recites that the titanyl phthalocyanine crystals are "obtained by subjecting amorphous or low crystallinity titanyl phthalocyanine . . . to crystal conversion with an organic solvent in the presence of water and

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then separating titanyl phthalocyanine having undergone crystal conversion from the organic solvent through filtration before it grows to an average particle diameter of primary particles more than 0.3 μm ."

The originally filed specification does not provide an adequate written description of obtaining titanyl phthalocyanine crystals by the process recited in instant claim 21. The originally filed specification at page 12, lines 19-20, describes titanyl phthalocyanine crystals preferably having an average primary particle diameter less than 0.3 μm . The originally filed specification at page 45, lines 2-6, further describes obtaining titanyl phthalocyanine by "without drying the . . . amorphous titanyl phthalocyanine (low crystallinity titanyl phthalocyanine) [an aqueous paste of amorphous titanyl phthalocyanine], mixing and stirring it with an organic solvent in the presence of water." The originally filed specification previously describes forming an aqueous paste of the amorphous titanyl phthalocyanine having a solid concentration of from about 5% by weight to 15% by weight. See the originally filed specification at page 43, line 15, to page 44, line 14. The crystal conversion process recited in instant claim 21 is broader than the originally described process because it does not require the amorphous titanyl phthalocyanine to be in an

aqueous paste as described in the originally filed specification.

Moreover, the originally filed specification at page 48, lines 3-25, discloses that "the crystal particle diameter has a proportional relation with crystal conversion time . . . so that it is also effective to terminate the reaction as soon as completion of a predetermined reaction (crystal conversion). The reaction is terminated by the addition of a large amount of a solvent in which crystal conversion does not occur smoothly as soon as the crystal conversion is completed . . . The crystal conversion can be terminated by adding 10 times the amount of such a solvent relative to the solvent used for crystal conversion. By adopting such a crystal conversion method, the primary particle size of titanyl phthalocyanine crystals can be reduced (less than $0.3\text{ }\mu\text{m}$. . . The titanyl phthalocyanines are filtered just after crystal conversion and separated from the solvent for crystal conversion." The originally filed specification does not appear to describe filtering the titanyl phthalocyanine having undergone crystal conversion "before it grows to an average particle diameter of more than $0.3\text{ }\mu\text{m}$," as recited in instant claim 21. Nor does the originally filed specification describe obtaining titanyl phthalocyanine crystals

having an average primary particle size of 0.3 μm or less as recited in instant claim 21.

10. Claim 2 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicants are required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim 2 recites that the "titanyl phthalocyanine crystals have a peak other than at 26.3°." However, claim 1, from which claim 2 depends, already recites that the titanyl phthalocyanine crystals do not have a diffraction peak at 26.3° and that there are peaks at other positions.

11. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

12. US 2003/0104295 (Niimi'295) has an effective US filing date of Mar. 22, 2002, and was published on Jun. 5, 2003. Both dates are prior to the US filing date, Sep. 8, 2003, of the instant specification. Thus, Niimi'295 qualifies as prior art under 35 U.S.C. 102(a), as well as under 35 U.S.C. 102(e).

Accordingly, Niimi'295 qualifies as prior art under 35 U.S.C. 103(c).

13. Claims 1-15 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi'295, as evidenced by applicants' admissions at page 3, line 10, to page 4, line 10 (applicants' admission 2), Japanese Patent 2000-319538 (JP'538), as evidenced by Ladd et al., Structure Determination by X-ray Diffraction, p. 426 (Ladd), combined with US 5,776,650 (Hashimoto) and US 2001/0022343 (Sakai). See the USPTO English-language translation of JP'538 for cites.

Niimi'295 discloses an image forming apparatus and a process cartridge. The image forming apparatus comprises a photoreceptor **6**, a charger **8**, a light irradiator **10**, an image developer **11**, and a transfer device **15**. Fig. 5 and paragraphs 0115, 0116, and 0122. Niimi'295 further teaches an image forming apparatus comprising a plurality of image forming units, each comprising a photoreceptor, a charger, a light irradiator, an image developer, and a transfer device. Fig. 10 and paragraphs 0127-0128. Niimi'295 also teaches a process cartridge that comprises a photoreceptor with a charger, an image irradiator, an image developer, and a cleaner. Fig. 7 and paragraph 0126. Niimi'295 teaches that the charger can be a

contact charging system, such as a contact charging roller, as recited in instant claim 11, or a non-contact proximal charging system as recited in instant claims 12 and 13.

Paragraphs 0117-0118. Niimi'295 also teaches that an alternating superimposed voltage can be applied to the charger, which meets the charger limitation recited in instant claim 14. Paragraph 0119.

Niimi'295 exemplifies a photoreceptor comprising a conductive support, a charge generation layer, a charge transport layer disposed on the charge generation layer, and three protective layers. See example 14 at pages 24-26. All three protective layers comprise α -alumina fine particles having a resistivity of $2.5 \times 10^{12} \Omega \cdot \text{cm}$, which meets the protective layer limitations recited in instant claims 5 and 6. Niimi'295 further discloses that the three protective layers can comprise a charge transferring polycarbonate having a side-chain comprising a triarylamine structure; and that they are formed using non-halogen solvents such as tetrahydrofuran and cyclohexanone. See example 7 at pages 21-22, and example 14. Because the first and second protective layers comprise the charge transferring polycarbonate, the layers are characterizable as charge transport layers and therefore meet the charge transport layer limitations recited in instant

claims 4, 7, and 8. Niimi'295 also teaches that the conductive support can be an anodized surface as recited in instant claim 9. Paragraphs 0047-0048. The charge generation layer comprises titanyl phthalocyanine crystals dispersed in a polyvinylbutyral binder resin. The titanyl phthalocyanine crystals exhibit an X-ray diffraction pattern having a maximum peak at a Bragg angle of 27.2° , a lowest peak at 7.3° , peaks at 9.4° , 9.6° , and 24° , no peaks between 7.3° and 9.4° , and no peak at 26.3° . See Fig. 8. The locations of the peaks at angles 7.3° , 9.4° , 9.6° , 24° , and 27.2° were determined by interpolating the positions on the x-axis scale in Fig. 8. The X-ray diffraction pattern meets the peak location limitations recited in instant claims 1, 2, and 21.

Niimi'295 does not disclose that the X-ray diffraction was obtained with the Cu-K α wavelength of 1.542 Å. However, as discussed above, the Niimi'295 X-ray diffraction pattern meets the peak location limitations recited in instant claims 1, 2, and 21. Accordingly, it is reasonable to presume that the X-ray diffraction pattern disclosed in Niimi'295 was determined with Cu-K α X-ray radiation having a wavelength of 1.542 Å as recited in the instant claims. The burden is on applicants to prove otherwise. In re Fitzgerald, 205 USPQ 594 (CCPA 1980).

Niimi'295 does not exemplify the use of titanyl

phthalocyanine crystals having an average particle diameter as recited in instant claims 1, 3, and 21. However, as discussed supra, the Niimi'295 charge generation layer comprises titanyl phthalocyanine crystals dispersed in a polyvinylbutyral binder resin, where the titanyl phthalocyanine crystals exhibit an X-ray diffraction pattern having a maximum peak at a Bragg angle of 27.2°. Niimi'295 teaches that the charge generation layer is prepared by mixing the charge generation material with a suitable solvent and binder resin and dispersing the mixture with "a ball mill . . .". Paragraph 0058.

Hashimoto teaches a method of preparing a charge generation dispersion liquid for forming a charge generation layer comprising the step of dispersing a charge generation pigment or dye and a binder resin with a "ball-shaped pulverizing media" in a dispersing solvent to an average particle size of about 0.1 to 0.3 μm . Col. 2, lines 52-68. Hashimoto exemplifies forming charge generation layers with said charge generation dispersion liquid where the average particle size of the organic pigment or dye dispersoids is either 0.15 μm or 0.18 μm . See the first and second embodiments at col. 6, line 33-64, and col. 7, lines 26-30, respectively, and in Table 1 at col. 8. The average particle sizes of about 0.1 to 0.3 μm , e.g., 0.15 μm or 0.18 μm , are within the particle diameter limitation

of 0.3 μm or less recited in instant claims 1 and 21. The average particle sizes of 0.15 and 0.18 μm are within the particle size limitation of "less than 0.3 μm " recited in instant claim 3. Hashimoto teaches that the charge generation pigments or dyes "are not specifically limited as far as the pigments or the dyes may function as a charge generating agent in a charge generation layer. For example, pigments such as phthalocyanine pigments . . ." Col. 4, lines 45-50. According to Hashimoto, when the organic pigment or dye is dispersed in a resin binder as taught by Hashimoto to an average particle size of about 0.1 to 0.3 μm , the "pigment or dye dispersoids are prevented from coagulating for a time period long enough to cause no problems in practical use of the dispersion liquid." Col. 4, lines 20-28. Hashimoto teaches that its dispersion liquid "exhibits excellent stability of the pigment or dye dispersoids, facilitates manufacturing electro-photographic photoconductors having a charge generation layer which exhibits excellent photographic properties." Col. 4, lines 29-33. The photoconductor also has improved stability. Col. 2, lines 41-43.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Niimi'295 and Hashimoto, to prepare a charge generation dispersion coating

solution comprising the Niimi'295 titanyl phthalocyanine and polyvinylbutyral resin used in the exemplified charge generation layer in example 14 of Niimi'295, as taught by Hashimoto, such that the resultant dispersion solution comprises titanyl phthalocyanine pigment dispersoids having an average particle size of about 0.1 to 0.3 μm , e.g., 0.15 μm or 0.18 μm , and to use the resultant dispersion solution to form the charge generation layer in the photoreceptor disclosed by Niimi'295. That person would have had a reasonable expectation of successfully obtaining an image forming apparatus that has improved stability and excellent photoconductive properties as taught by Hashimoto.

Instant claim 1 is written in product-by-process format. The combined teachings of Niimi'295 and Hashimoto do not disclose that the charge generation layer is formed by the method recited in the instant claim 1. However, as discussed above, the combined teachings of Niimi'295 and Hashimoto render obvious a titanyl phthalocyanine having an average particle size of about 0.1 to 0.3 μm , e.g., 0.15 μm or 0.18 μm . The average particle sizes of 0.15 or 0.18 μm meet the average particle size limitation of 0.3 μm or less recited in instant claim 1. Thus, it appears that the charge generation layer rendered obvious over the combined teachings of Niimi'295 and

Hashimoto is the same or substantially the same as the instantly recited charge generation layer made by the process recited in instant claim 1. The burden is on applicants to prove otherwise. In re Marosi, 218 USPQ 289 (Fed. Cir. 1983); In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985); MPEP 2113.

Instant claim 21 is written in product-by-process format. Niimi'295 does not disclose that its titanyl phthalocyanine is obtained by the method recited in instant claim 21. However, the Niimi'295 titanyl phthalocyanine exhibits an X-ray diffraction spectrum that meets the spectrum recited in instant claim 21. The titanyl phthalocyanine average particle size of 0.15 μm or 0.18 μm , which is rendered obvious over the combined teachings of Niimi'295 and Hashimoto, meets the particle size limitation of 0.3 μm or less recited in instant claim 21. Therefore, it appears that the titanyl phthalocyanine rendered obvious over the combined teachings of Niimi'633 and Hashimoto is the same or substantially the same as the instantly recited titanyl phthalocyanine crystals made by the process steps recited in the instant claim. The burden is on applicants to prove otherwise. Marosi; Thorpe; MPEP 2113.

Niimi'295 does not disclose that its light irradiator is "configured to irradiate a write light having a resolution of 600 dpi or greater" as recited in instant claims 1 and 21.

Sakai discloses a multi-beam scanning device to imagewise irradiate the charged photoconductor to form a latent electrostatic latent image. The multi-beam scanning device comprises a semiconductor laser (i.e., a laser diode) array **112** and a rotary polygonal mirror **152**. Fig. 6, paragraph 0131. The writing density of the multi-beam scanning device is 1200 dpi and the laser beam has a beam spot diameter of 30 μm . Paragraph 0137. The writing density of 1200 dpi meets the resolution limitations recited in instant claim 1. According to Sakai, the multi-beam scanning device "effectively reduces the variations of the beam spots on the scanned surface to a smallest possible level so that the multi-beam scanning is carried out with accurate beam spot diameter so as to create good quality reproduced image." Sakai discloses that in conventional multi-beam scanning devices, the divergence angle of the laser beams emitted by the semiconductor laser array is liable to variations that cause the degradation of the quality of a reproduced image. Paragraph 0009.

It would have been obvious for a person having ordinary skill in the art to use the Sakai multi-beam scanning device as the light irradiator in the apparatus or the process cartridge rendered obvious over the combined teachings of Niimi'295 and Hashimoto. That person would have had a reasonable expectation

of successfully obtaining an image forming apparatus and a process cartridge that provide good quality reproduced images having a resolution of 1200 dpi.

The cited prior art does not expressly describe an image developer "configured to" develop a latent electrostatic image formed on the surface of the photoreceptor within 200 msec after the surface of the photoreceptor is exposed by the light irradiator as recited in instant claim 1. Nor does cited prior art expressly describe a light irradiator "configured to" irradiate a write light on the surface of the photoreceptor with an exposure energy of 5 erg/cm² or less as recited in instant claims 1 and 21.

However, said recitations are merely functional language describing how the apparatus functions. For the reasons discussed supra, the apparatuses and process cartridge rendered obvious over the combined teachings of the prior art meet all of the structural and compositional limitations recited in the instant claims. "Claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function." See MPEP 2114 and cases cited therein. "A claim containing a 'recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus'

if the prior art apparatus teaches all the structural limitations of the claim." MPEP 2114, citing Ex parte Masham, 2 USPQ2d 1647 (BPAI 1987).

The functional recitations do not distinguish the structural elements in the instantly claimed apparatus and process cartridge from those in the apparatuses and process cartridge rendered obvious over the cited prior art.

Furthermore, according to Niimi'295, by using its image forming apparatuses and process cartridge, "high speed printing is possible . . . high qualities images can be formed steadily even after repeated use." Paragraph 0023. According to the instant specification, the characteristic time in known speedup monochrome electrophotographic apparatuses from a "writing portion," i.e., exposure from the light irradiator in the apparatus, to a "development portion," i.e., development of the latent image with a toner, is "about 200 msec at the longest." See the instant specification, the paragraph bridging pages 3 and 4. Thus, the time between exposure and development of "within 200 msec" recited in instant claim 1 appears to be characteristic of the state of the art as of the filing date of the instant application. The instant specification further discloses that in tandem full-color electrophotographic apparatuses, where the photoconductors have a diameter of 30 μm

and the copying speed reaches 30 sheets/min or greater, "the time between exposure and development can be set only equal to or less than that of the monochrome electrophotographic apparatus." Page 4, lines 2-10. Thus, a person having ordinary skill in the art would have reasonably expected that the time from exposure to development in speedup image forming apparatuses based on the state of the art, such as those taught by Niimi'295, is at most 200 msec.

Moreover, as discussed above, the combined teachings of Niimi'295 and Hashimoto render obvious a photoreceptor that meets all the structural and compositional limitations recited in the instant claims. Furthermore, example 14 of Niimi'295 uses a semiconductor laser of 780 nm as the light source for image exposure. JP'538 exemplifies a photoreceptor comprising a charge generation layer comprising titanyl phthalocyanine crystals that exhibit an X-ray diffraction pattern that is similar to that of the Niimi'295 titanyl phthalocyanine crystals and that meets the peak locations recited in instant claims 1, 2, and 21. The JP'538 X-ray diffraction pattern has a maximum peak at a Bragg angle of $27.2^{\circ} \pm 0.2^{\circ}$ and a lowest peak at an angle of 7.3° , when a specific X-ray of Cu-K α having a wavelength of 1.514 Å irradiates the titanyl phthalocyanine pigment. Translation, paragraph 0012, and example 1 in

paragraphs 0047-0052 and in Table 1, and Fig. 5. JP'538 teaches that there are no peaks between Bragg angles 7.4° and 9.4° . Translation, paragraph 0012. The interval between the peaks meets the limitation of "not having a peak within the range of from 7.4 to 9.3° " recited in instant claim 1. The diffraction spectrum further has a peak at 9.5° , a peak at 9.7° , a peak at 24° , and no peak at 26.3° . See Fig. 5. The peaks at 27.2° , 7.3° , 9.5° , 9.7° , and 24° , and no peak at 26.3° meet the limitations in the "X-ray diffraction spectrum" recited in instant claims 1, 2, and 21. The locations of the peaks at angles 9.5° , 9.7° , and 24° were determined by interpolating the positions on the x-axis in Fig. 5. (The JP'538 reported wavelength of 1.514 \AA appears to be a typographical error. The "Cu-K α wavelength" of 1.514 \AA does not appear to exist. It is well known that the Cu-K α spectra line is a doublet consisting of α_1 ($\lambda = 1.5405$) and α_2 ($\lambda = 1.5443$). The weighted mean K α line is 1.542 \AA , which is the value normally used in Cu-K α X-ray diffraction. See Ladd, p. 426. Accordingly, because JP'538 teaches using the X-ray of Cu-K α and that Cu-K α is known in the art to have mean wavelength of 1.542 \AA , it is reasonable to presume that the X-ray diffraction spectrum disclosed in JP'538 is determined with Cu-K α having a wavelength of 1.542 \AA . The burden is on applicants to prove otherwise. Fitzgerald, supra.

According to JP'538, the light exposure energy at a wavelength of 780 nm required to reduce the surface potential of the photoreceptor 15 seconds after charging is $0.20 \mu\text{J}/\text{cm}^2$, i.e., $2 \text{ erg}/\text{cm}^2$. See Table 3 at page 29 and the accompanying text. The light exposure energy of $2 \text{ erg}/\text{cm}^2$ is within the range of "5 erg/cm^2 or less" recited in instant claims 1 and 21.

Accordingly, because the photoreceptor rendered obvious over the combined teachings of Niimi'295 and Hashimoto comprises the Niimi'295 titanyl phthalocyanine crystals that appear to exhibit an X-ray diffraction pattern that is similar to that of JP'538, it is reasonable to presume that the photosensitivity of that photoreceptor would also be similar to that in JP'538. The burden is on applicants to prove otherwise.

Thus, it would have obvious for a person having ordinary skill in the art to minimize, through routine experimentation, the light exposure energy in the image forming apparatus rendered obvious over the combined teachings of Niimi'295, Hashimoto, and Sakai such that the light exposure is within the range of $5 \text{ erg}/\text{cm}^2$ or less as recited in instant claims 1 and 21. The "motivation" to minimize the light exposure energy is the common technological desire to maximize the efficient use of energy in processes and apparatuses.

14. Claims 1-3, 5-8, 10, 11, 13-15, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2002/0076633 A1 (Niimi'633), as evidenced by applicants' admission 2, JP'538, and Ladd, combined with Hashimoto and Sakai. See the USPTO translation of JP'538 for cites.

Niimi'633 discloses an image forming apparatus that comprises a photoreceptor **1**, a charger **8**, a light irradiator **10**, an image developer **11**, and a transfer device **15a**, **15b**. Fig. 3 paragraphs 0061 and 0300-0305. Niimi'633 further teaches an image forming apparatus comprising a plurality of image forming units, each comprising a photoreceptor, a charger, a light irradiator, an image developer, a cleaner, and a transfer device. Fig. 7 and paragraphs 0320-0324. Niimi'633 teaches that the charger can be a contact charging system, such as a contact charging roller, as recited in instant claim 11. Paragraph 0302 and Fig. 3, reference label **8**. Because the contact charging roller is in contact with the photoconductor, it meets the charger limitation recited in instant claim 13 that the gap between the charging member and the photoconductor is "200 μm or less." Niimi'633 also teaches that an alternating superimposed voltage can be applied to the charger, which meets the charger limitation recited in instant claim 14. Paragraph 0302.

Niimi'633 exemplifies a photoreceptor comprising an aluminum conductive drum, a charge generation layer, a charge transport layer disposed on the charge generation layer, and a protective layer. See example 28 at pages 32-33. The protective layer comprises particulate alumina having a specific resistivity of $2.5 \times 10^{12} \Omega \cdot \text{cm}$, which meets the protective layer limitations recited in instant claims 5 and 6. The charge generation layer comprises titanyl phthalocyanine crystals dispersed in a polyvinylbutyral binder resin. The titanyl phthalocyanine crystals exhibit an X-ray diffraction pattern having a maximum peak at a Bragg angle ($2\theta \pm 0.2^\circ$) of 27.2° , a lowest peak at 7.3° , peaks at 9.4° , 9.6° , and 24° , no peaks between 7.3° and 9.4° , and no peak at 26.3° . The diffraction pattern is obtained by irradiating the titanyl phthalocyanine with an X-ray of Cu-K α having a wavelength of "1.541 Å." Paragraph 0151; Fig. 6; and example 28 at pages 32-33. The location of the peaks at angles 7.3° , 9.4° , 9.6° , and 24° were determined by interpolating the positions on the x-axis scale in Fig. 6. The X-ray diffraction pattern meets the peak location limitations recited in instant claims 1, 2, and 21.

Niimi'633 further teaches that the charge transport layer can be formed from a non-halogen solvent, such as tetrahydrofuran or dioxane, which meets the solvent limitations

recited in instant claims 7 and 8. Paragraph 0173 and example 1 in paragraphs 0364-0367.

Niimi'633 does not exemplify the use of titanyl phthalocyanine crystals having an average particle diameter as recited in instant claims 1, 3, and 21. However, as discussed supra, the Niimi'633 charge generation layer comprises titanyl phthalocyanine crystals dispersed in a polyvinylbutyral binder resin, where the titanyl phthalocyanine crystals exhibit an X-ray diffraction pattern having a maximum peak at a Bragg angle of 27.2° . In addition, Niimi'633 teaches that the charge generation layer is prepared by mixing the charge generation material with a proper solvent and binder resin and dispersing the mixture with "a ball mill . . . to prepare a coating liquid." Paragraphs 0154-0157.

Hashimoto teaches a method of preparing a charge generation dispersion liquid for forming a charge generation layer comprising the step of dispersing a charge generation pigment or dye and a binder resin with a "ball-shaped pulverizing media" in a dispersing solvent to an average particle size of about 0.1 to 0.3 μm , e.g., 0.15 μm or 0.18 μm . The average particle sizes of about 0.1 to 0.3 μm , e.g., 0.15 μm or 0.18 μm , are within the particle diameter limitation of 0.3 μm or less recited in instant claims 1 and 21. The average particle sizes of 0.15

and 0.18 μm are within the particle size limitation of "less than 0.3 μm " recited in instant claim 3. The discussion of Hashimoto in paragraph 13 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Niimi'633 and Hashimoto, to prepare a charge generation dispersion coating solution comprising the Niimi'633 titanyl phthalocyanine pigment and polyvinylbutyral resin used in the charge generation layer in example 28 of Niimi'633, as taught by Hashimoto, such that the resultant dispersion solution comprises titanyl phthalocyanine pigment dispersoids having an average particle size of about 0.1 to 0.3 μm , e.g., 0.15 μm or 0.18 μm , and to use the resultant dispersion solution to form the charge generation layer in the photoreceptor disclosed by Niimi'633. That person would have had a reasonable expectation of successfully obtaining an image forming apparatus that has improved stability and excellent photoconductive properties as taught by Hashimoto.

Instant claim 1 is written in product-by-process format. The combined teachings of Niimi'633 and Hashimoto do not disclose that the charge generation layer is formed by the method recited in the instant claim 1. However, as discussed

above, the combined teachings of Niimi'633 and Hashimoto render obvious a titanyl phthalocyanine pigment having an average particle size of about 0.1 to 0.3 μm , e.g., 0.15 μm or 0.18 μm . The average particle sizes of 0.15 or 0.18 μm meet the average particle size limitation of 0.3 μm or less recited in instant claim 1. Thus, it appears that the charge generation layer rendered obvious over the combined teachings of Niimi'633 and Hashimoto is the same or substantially the same as the instantly recited charge generation layer made by the process recited in instant claim 1. The burden is on applicants to prove otherwise. Marosi, supra; Thorpe, supra; MPEP 2113.

Instant claim 21 is written in product-by-process format. Niimi'633 does not disclose that its titanyl phthalocyanine material is obtained by the method recited in instant claim 21. However, the Niimi'633 titanyl phthalocyanine pigment exhibits an X-ray diffraction spectrum that meets the spectrum recited in instant claim 21. The titanyl phthalocyanine pigment average particle size of 0.15 μm or 0.18 μm , which is rendered obvious over the combined teachings of Niimi'633 and Hashimoto, meets the particle size limitation of 0.3 μm or less recited in instant claim 21. Therefore, it appears that the titanyl phthalocyanine pigment rendered obvious over the combined teachings of Niimi'633 and Hashimoto is the same or

substantially the same as the instantly recited titanyl phthalocyanine crystal made by the process steps recited in the instant claim. The burden is on applicants to prove otherwise. Marosi; Thorpe; MPEP 2113.

Niimi'633 does not disclose that its light irradiator is "configured to irradiate a write light having a resolution of 600 dpi or greater" as recited in the instant claims.

Sakai discloses a multi-beam scanning device to imagewise irradiate the charged photoconductor to form a latent electrostatic latent image. The multi-beam scanning device comprises a semiconductor laser (or laser diode) array **112** and a rotary polygonal mirror **152**. The scanning device provides a writing density of 1200 dpi and the laser beam has a beam spot diameter of 30 μm . The discussion of Sakai in paragraph 13 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art to use the Sakai multi-beam scanning device as the light irradiator in the apparatus rendered obvious over the combined teachings of Niimi'633 and Hashimoto. That person would have had a reasonable expectation of successfully obtaining an image forming apparatus that provides good quality reproduced images having a resolution of 1200 dpi.

The cited prior art does not expressly describe an image

developer "configured to" develop a latent electrostatic image formed on the surface of the photoreceptor within 200 msec after the surface of the photoreceptor is exposed by the light irradiator as recited in instant claim 1. Nor does cited prior art expressly describe a light irradiator "configured to" irradiate a write light on the surface of the photoreceptor with an exposure energy of 5 erg/cm² or less as recited in instant claims 1 and 21.

However, said recitations are merely functional language describing how the apparatus functions. For the reasons discussed supra, the apparatuses and process cartridge rendered obvious over the combined teachings of the prior art meet all of the structural and compositional limitations recited in the instant claims. The functional recitations do not distinguish the structural elements in the instantly claimed apparatus and process cartridge from those in the apparatuses and process cartridge rendered obvious over the cited prior art.

Furthermore, according to the instant specification, the characteristic time in known speedup monochrome electrophotographic apparatuses from a "writing portion," i.e., exposure from the light irradiator in the apparatus, to a "development portion," i.e., development of the latent image with a toner, is "about 200 msec at the longest." See the

instant specification, the paragraph bridging pages 3 and 4. Thus, the time between exposure and development of "within 200 msec" recited in instant claim 1 appears to be characteristic of the state of the art as of the filing date of the instant application. The instant specification further discloses that in tandem full-color electrophotographic apparatuses, where the photoconductors have a diameter of 30 μm and the copying speed reaches 30 sheets/min or greater, "the time between exposure and development can be set only equal to or less than that of the monochrome electrophotographic apparatus." Page 4, lines 2-10. Thus, a person having ordinary skill in the art would have reasonably expected that the time from exposure to development in speedup image forming apparatuses based on the state of the art, such as those taught by Niimi'633, is at most 200 msec.

Moreover, as discussed above, the combined teachings of Niimi'633 and Hashimoto render obvious a photoreceptor that meets all the structural and compositional limitations recited in the instant claims. Furthermore, example 28 of Niimi'633 uses a laser diode having a wavelength of 780 nm as the light source for image exposure. Niimi'633, paragraph 0491. JP'538 exemplifies a photoreceptor comprising a charge generation layer comprising titanyl phthalocyanine crystals that exhibit an X-ray

diffraction pattern that is similar to that of the Niimi'633 titanyl phthalocyanine crystals and that meets the peak locations recited in instant claims 1, 2, and 21. The discussion of JP'538 and Ladd in paragraph 13 are incorporated herein by reference. As discussed in paragraph 13 above, according to JP'538, the light exposure energy at a wavelength of 780 nm required to reduce the surface potential of the photoreceptor 15 seconds after charging is $0.20 \mu\text{J}/\text{cm}^2$, i.e., $2 \text{ erg}/\text{cm}^2$. The light exposure energy of $2 \text{ erg}/\text{cm}^2$ is within the range of " $5 \text{ erg}/\text{cm}^2$ or less" recited in instant claims 1 and 21. Accordingly, because the photoreceptor rendered obvious over the combined teachings of Niimi'633 and JP'337 comprises the Niimi'633 titanyl phthalocyanine crystals that appear to exhibit a X-ray diffraction pattern that is similar to that of JP'538, it is reasonable to presume that the photosensitivity of that photoreceptor would also be similar to that in JP'538. The burden is on applicants to prove otherwise.

Thus, it would have obvious for a person having ordinary skill in the art to minimize, through routine experimentation, the light exposure energy in the image forming apparatus rendered obvious over the combined teachings of Niimi'633, Hashimoto, and Sakai such that the light exposure is within the range of $5 \text{ erg}/\text{cm}^2$ or less as recited in instant claims 1 and 21.

The "motivation" to minimize the light exposure energy is the common technological desire to maximize the efficient use of energy in processes and apparatuses.

15. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi'633, as evidenced by applicants' admission 2, JP'538, and Ladd, combined with Hashimoto and Sakai, as applied to claim 1 above, further combined with US 2002/0051654 (Niimi'654). See the USPTO translation of JP'538 for cites.

The claim is rejected for the reasons set forth in the office action mailed on Nov. 8, 2007, paragraph 14, which are incorporated herein by reference.

16. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi'633, as evidenced by applicants' admission 2, JP'538, and Ladd, combined with Hashimoto and Sakai, as applied to claim 1 above, further combined with US 6,120,955 (Tokutake). See the USPTO translation of JP'538 for cites.

The claim is rejected for the reasons set forth in the office action mailed on Nov. 8, 2007, paragraph 15, which are incorporated herein by reference.

17. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niimi'633, as evidenced by applicants' admission 2, JP'538, and Ladd, combined with Hashimoto and Sakai, as applied to claim 1 above, further combined with Niimi'654. See the USPTO translation of JP'538 for cites.

The claims are rejected for the reasons discussed in the office action mailed on Mar. 9, 2006, paragraph 26, which are incorporated herein by reference.

18. Applicants' arguments filed on Oct. 7, 2008, as applicable to the prior art rejections set forth in paragraphs 13-17 above have been fully considered but they are not persuasive.

Applicants assert that Niimi'295 is not prior art under 35 U.S.C. 102(a) because they have perfected their claim to foreign priority under 35 U.S.C. 119 to the priority document, Japanese Patent Application 2002-263941, by filing a certified English translation of said document on Oct. 7, 2008. Applicants conclude that Niimi'295 is prior art under 35 U.S.C. 102(e). Applicants then assert that under the provisions of 35 U.S.C. 103(c) Niimi'295 cannot be used in a rejection under 35 U.S.C. 103(a) because "it is commonly assigned to the same entity as the present invention."

Applicants' assertions are not persuasive. Applicants have not indicated where in the verified English-language translation of said priority document filed on Oct. 7, 2008, there is an adequate written description of the subject matter recited in instant claims 1-15 and 21. The examiner has not found where the subject matter recited in the instant claims is described in the translation as set forth under 35 U.S.C. 112, first paragraph, for the following reasons:

(1) The translation does not describe the X-ray diffraction pattern of titanyl phthalocyanine crystals recited in the instant claims 1 and 21. The translation describes "titanyl phthalocyanine crystals having, as a diffraction peak ($\pm 0.2^\circ$) of Bragg angle 2θ . . . main peaks at 9.4° . . . and a peak at 7.3° as a diffraction peak on the lowest angle side, and not having a peak within a range of from 7.4° to 9.4° ," not the limitation, "from 7.3° to 9.4° " as recited in instant claims 1 and 21. See the translation, claims 1 and 2 at page 3, and paragraph 0019 at page 14. The limitation "not having a peak within a range of from 7.3° to 9.4° " is broader than the translation limitation of "not having a peak within a range of from 7.4° to 9.4° " because it further excludes peaks between 7.3 to 7.4° .

(2) The translation further does not describe the titanyl phthalocyanine crystals made by the process steps recited in

instant claim 1 for the reasons discussed in paragraph 9, item (2) above, except for the particular references to the disclosure in originally filed specification. See the translation, claim 3 at page 3, and paragraphs 0019 and 0067.

(3) The translation also does not describe the titanyl phthalocyanine crystals made by the process steps recited in instant claim 21 for the reasons discussed in paragraph 9, item (3) above, except for the particular references to the disclosure in originally filed specification. See the translation, claim 3 at page 3, and paragraphs 0019, 0055, 0056, 0058, 0062, and 0063.

(4) The translation does not describe the apparatus recited in instant claim 21. The translation describes an apparatus where the "photoreceptor takes 200 msec or less to reach from the light exposure means to the developing means." See translation, claim 1 at page 3, and paragraph 0019 at page 14. The apparatus recited in instant claim 21 does not require that the photoreceptor takes 200 msec or less to reach from the light irradiator to the developer as described in the translation.

Thus, for the reasons discussed above, Niimi'295 qualifies as prior art under 35 U.S.C. 102(a) and 35 U.S.C. 103(c) to the subject matter recited in the instant claims.

Moreover, when Niimi'295 is considered to be prior art under 35 U.S.C. 102(e), Niimi'295 further qualifies as prior art under 35 U.S.C. 103(c). Applicants' statement of common ownership clearly and unambiguously asserts no more than that company X owns application A (the present application) and application B (the reference patent). However, applicants do not state clearly and unambiguously that when the invention in application A was made, company X owned both application A and application B. A proper statement of ownership would be, "Application X and Patent A were, at the time the invention of Application X was made, owned by Company Z." See MPEP 706.02(1)(2)(II) (8th edition, Rev. 6, Sep. 2007) and the Official Gazette, December 26, 2000, 1241 OG 96, "Guidelines Setting Forth a Modified Policy Concerning the Evidence of Common Ownership, or an Obligation of Assignment to the Same Person as Required by 35 U.S.C. 103(c)," III and IV.

Accordingly, the rejection under 35 U.S.C. 103(a) over Niimi'295 stands.

Applicants further assert that none of the cited prior art discloses or suggests forming a charge generation layer by the method where the titanyl phthalocyanine crystals have an average particle diameter of 0.3 μm or less as recited in instant claim 1.

Applicants' assertions are not persuasive. Instant claim 1 is drawn to a product, not to a process of making. Furthermore, as noted in the rejection in paragraphs 13 and 14 above, the combined teachings of Niimi'295 and Hashimoto and the combined teachings of Niimi'633 and Hashimoto render obvious a charge generation layer dispersion that comprises titanyl phthalocyanine crystals having an average particle diameter of 0.15 or 0.18 μm , which are within the range of 0.3 μm or less recited in instant claim 1. Thus, it appears that the charge generation layers rendered obvious over the combined teachings of Niimi'295 and Hashimoto or over the combined teachings of Niimi'633 and Hashimoto are the same or substantially the same as the instantly recited charge generation layer made by the process recited in instant claim 1.

Moreover, the showing in the instant specification, in particular examples 2 and 9 in Table 3, is insufficient to show that the charge generation layer made by the process steps recited in instant claim 1 is not the same as that the charge generation layers rendered obvious over the combined teachings of the cited prior art. The photoreceptor exemplified in Example 9 of the instant specification is preferred because it comprises titanyl phthalocyanine crystals having a preferred average primary particle diameter of 0.24 μm . See instant

claim 3. Thus, applicants have not shown that a charge generation layer commensurate in scope with the full range of instant claim 1 has the properties asserted by applicants. In addition, example 2 does not exemplify a charge generation layer dispersion made by the process disclosed in Hashimoto, where the resultant dispersion comprises titanyl phthalocyanine pigment dispersoids having an average particle size of 0.15 or 0.18 μm . Thus, the showing in the instant specification does not appear to be a probative comparison to the charge generation layers rendered obvious over the combined teachings of the cited prior art. Accordingly, applicants have not met their burden to show that the charge generation layers rendered obvious over the combined teachings of the cited prior art are not the same or substantially the same as the charge generation layer made by the process recited in instant claim 1.

Applicants also assert that none of the cited prior art discloses or suggests obtaining titanyl phthalocyanine crystals by the method recited in instant claim 21.

Applicants' assertion misses the point. Instant claim 21 is written in product-by-process format. Instant claim 21 is drawn to a product, not to a process of making. Furthermore, as noted in the rejection in paragraphs 13 and 14 above, the titanyl phthalocyanines having an average particle size of 0.15

or 0.18 μm , which is rendered obvious over the combined teachings of the cited prior, meet the particle size limitation recited in instant claim 21. Thus, it appears that the titanyl phthalocyanines rendered obvious over the combined teachings of Niimi'295 and Hashimoto or over the combined teachings of Niimi'633 and Hashimoto are the same or substantially the same as the instantly recited titanyl phthalocyanine crystals made by the process steps recited in instant claim 21. Moreover, the showing in the instant specification, in particular examples 2 and 9 in Table 3, is insufficient to show that the titanyl phthalocyanine crystals made by the process steps recited in instant claim 21 are different from those rendered obvious over the combined teachings of the cited prior art. The instant specification does not describe making the titanyl phthalocyanine crystals in the photoreceptor exemplified in example 9 by the process steps recited in instant claim 21. Furthermore, claim 21 does not require that the filtering step is performed with a filter having an effective pore size of 3 μm in forming the charge generation layer dispersion solution used in example 9. Thus, applicants have not met their burden to show that the titanyl phthalocyanines rendered obvious over the combined teachings of the cited prior art are not the same or

substantially the same as the titanyl phthalocyanine made by the process steps recited in instant claim 21.

Accordingly, the rejections in paragraphs 13-17 stand.

19. Claims 1-15 and 21 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 7-23, 28, and 33-39 of copending US application 10/606,750 (Application'750), as evidenced by applicants' admission 2, JP'538, and Ladd, in view of Sakai. See the USPTO translation of JP'538 for cites.

Reference claim 17, which depends on reference claim 28 of Application'750, recites an image forming apparatus comprising at least one image forming unit that comprises the photoreceptor of claim 28, a charger, a light irradiator, an image developer, and a transfer device. The photoreceptor comprises an electroconductive substrate comprising a charge generation layer that comprises a titanyl phthalocyanine and a charge transport layer formed on the charge generation layer, which meets the layer structure recited in instant claims 1 and 21. The charge transport layer is formed using a non-halogen solvent as recited in instant claim 7. The titanyl phthalocyanine has an X-ray diffraction spectrum according to Figure 13 when Cu-Ka X-ray having a wavelength of 1.542 Å is used. Figure 13 shows an

X-ray spectrum having a maximum peak at a Bragg angle ($2\theta \pm 0.2^\circ$) of 27.2° , a lowest peak at 7.3° , peaks at 9.4° , 9.6° , and 24.0° , no peaks between 7.3° and 9.4° , and no peak at 26.3° . The locations of the peaks at the particular angles were determined by correlating the positions with the x-axis in Fig. 13. The titanyl phthalocyanine has an average particle diameter of not greater than $0.3\ \mu\text{m}$. The titanyl phthalocyanine meets the compositional limitations of the titanyl phthalocyanine crystals recited in instant claims 1-3 and 21.

Reference claim 7, which depends from reference claim 28, requires that charge generation layer be formed from a filtered dispersion that is within the product-by-process limitations recited in instant claim 1. Reference claim 8, which depends from reference claim 28, requires that the titanyl phthalocyanine in the charge generation layer be prepared by a process that is within the product-by-process limitations recited in instant claim 21.

Reference claim 9, which depends from reference claim 28, requires that the charge transport layer comprise a polycarbonate resin having at least a triaryl amine structure as recited in instant claim 4. Reference claims 10-12, which depend from reference claim 28, require that the photoreceptor further comprises a protective layer disposed on the charge

transport layer that meets the protective layer limitations recited in instant claims 5 and 6. Reference claims 15 and 16, which each depends from reference claim 28, require that the electroconductive substrate is subjected to an anodic oxidation treatment and that the non-halogen solvent be a cyclic ether or an aromatic hydrocarbon, respectively, which meets the support limitation and compositional limitation of the non-halogen solvent recited in instant claims 9 and 8, respectively.

Reference claim 18, which depends from reference claim 17, requires that the apparatus comprise a plurality of image forming units, which meets the apparatus limitation recited in instant claim 10. Reference claims 20 and 21, which depends on reference claim 28, requires that the charger be a contact charger or a non-contact charger as recited in instant claim 11 and in instant claims 12 and 13, respectively. Reference claim 22, which depends on reference claim 20, requires that an alternating superimposed voltage can be applied to the charger, which meets the charger limitation recited in instant claim 14. Reference claim 23, which also depends from reference claim 28, recites a process cartridge comprising said photoreceptor and at least one unit selected from the Markush group recited in reference claim 23.

The claims in Application'750 do not recite that the light

irradiator is configured to irradiate a write light having a resolution of 600 dpi or greater as recited in instant claims 1 and 21. However, reference claim 19, which depends on reference claim 17, requires that the light irradiator to be a light emitting diode or a laser diode.

Sakai discloses a multi-beam scanning device to imagewise irradiate the charged photoconductor to form a latent electrostatic latent image. The multi-beam scanning device comprises a semiconductor laser (i.e., a laser diode) array **112** and a rotary polygonal mirror **152**. The scanning device provides a writing density of 1200 dpi and the laser beam has a beam spot diameter of 30 μm . The discussion of Sakai in paragraph 13 above is incorporated herein by reference.

It would have been obvious for a person having ordinary skill in the art, in view of the subject matter recited in the claims of Application'750 and the teachings in Sakai, to use the Sakai multi-beam scanning device as the light irradiator in the apparatus and process cartridge claimed in Application'750. That person would have had a reasonable expectation of successfully obtaining an image forming apparatus and a process cartridge that provide good quality reproduced images having a resolution of 1200 dpi.

The claims in Application'750 do not recite, and Sakai does

not disclose an image developer "configured to" develop a latent electrostatic image formed on the surface of the photoreceptor within 200 msec after the surface of the photoreceptor is exposed by the light irradiator as recited in instant claim 1. Nor do the Application'750 claims recite or Sakai disclose a light irradiator "configured to" irradiates a write light on the surface of the photoreceptor with an exposure energy of 5 erg/cm² or less as recited in instant claims 1 and 21.

However, said recitations are merely functional language describing how the apparatus functions. For the reasons discussed supra, the apparatus rendered obvious over the subject matter claimed in Application'750 combined with the teachings of Sakai meet all of the structural limitations recited in the instant claims. The functional recitations do not distinguish the structural elements in the instantly claimed apparatus from those in the apparatus rendered obvious over the subject matter claimed in Application'750 combined with the teachings of Sakai.

Furthermore, based on the disclosure in the instant specification, the time between exposure and development of "within 200 msec" recited in instant claim 1 appears to be characteristic of the state of the art as of the filing date of the instant application. The discussion of the disclosure in the instant specification at pages 3 and 4 in paragraph 13 above

is incorporated herein by reference. Thus, a person having ordinary skill in the art would have reasonably expected that the time from exposure to development in speedup image forming apparatuses based on the state of the art, such as those claimed in Application'750, is at most 200 msec.

Moreover, as discussed above, the photoreceptor claimed in Application'750 meets all the structural and compositional limitations recited in the instant claims. JP'538 exemplifies a photoreceptor comprising a charge generation layer comprising titanyl phthalocyanine crystals that exhibit an X-ray diffraction pattern that is similar to that of the claimed in Application'750 and meets the peak locations recited in instant claims 1, 2, and 21. The discussions of JP'538 and Ladd in paragraph 13 are incorporated herein by reference. As discussed in paragraph 13 above, according to JP'538, the light exposure energy at a wavelength of 780 nm required to reduce the surface potential of the photoreceptor 15 seconds after charging is $0.20 \mu\text{J}/\text{cm}^2$, i.e., $2 \text{ erg}/\text{cm}^2$. The light exposure energy of $2 \text{ erg}/\text{cm}^2$ is within the range of " $5 \text{ erg}/\text{cm}^2$ or less" recited in instant claim 1. Accordingly, because the photoreceptor recited in the claims of Application'750 comprises titanyl phthalocyanine crystals that appear to exhibit a X-ray diffraction pattern that is similar to that of JP'538, it is

reasonable to presume that the photosensitivity of the photoreceptor in Application'750 would also be similar to that in JP'538. The burden is on applicants to prove otherwise.

Fitzgerald, supra.

Thus, it would have obvious for a person having ordinary skill in the art to minimize, through routine experimentation, the light exposure energy in the image forming apparatuses rendered obvious over the subject matter claimed in Application'750 combined with teachings of Sakai such that the light exposure is within the range of 5 erg/cm² or less as recited in instant claim 1. The "motivation" to minimize the light exposure energy is the common technological desire to maximize the efficient use of energy in processes and apparatuses.

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L. Dote whose telephone number is (571) 272-1382. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry regarding papers not received regarding this communication or earlier communications should be directed to Supervisory Application Examiner Ms. Sandra Sewell, whose telephone number is (571) 272-1047.

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/Janis L. Dote/
Primary Examiner, Art Unit 1795

JLD
Nov. 20, 2008